

**ATTACHMENT L: REQUIREMENTS FOR INADVERTENT FLUID RELEASE
PREVENTION, MONITORING, AND CONTINGENCY PLAN FOR HDD OPERATIONS**

**REQUIREMENTS FOR INADVERTENT FLUID RELEASE PREVENTION,
MONITORING, AND CONTINGENCY PLAN FOR HDD OPERATIONS**

Prepared for the

**CENTRAL MAINE POWER COMPANY
NEW ENGLAND CLEAN ENERGY CONNECT
KENNEBEC RIVER CROSSING**



Location

**West Forks Plantation &
Moxie Gore,
Maine 04985**

Owner

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Requirements for Inadvertent Fluid Release Prevention, Monitoring, and Contingency Plan for HDD Operations

This document lists the minimum requirements for a site-specific inadvertent fluid release plan that shall be prepared by the Horizontal Directional Drilling (HDD) Contractor selected for this project. The purpose of this plan is to prevent any inadvertent fluid releases, to quickly identify any inadvertent fluid releases that do occur, and to contain, minimize, and remediate any environmental impacts associated with any release of HDD drilling fluids.

The final inadvertent fluid release prevention, monitoring, and contingency plan will be provided to the Owner, and relevant regulatory agencies before the commencement of drilling activities.

1 PROJECT SUMMARY

Avangrid – Central Maine Power Company (CMP) (Owner) intends to contract for HDD services for the NECEC Kennebec River Crossing project.

This project generally consists of installation of a HVDC electric power transmission line under the Kennebec River in the area of Moxie Gorge. This section of the Kennebec River is designated as an Outstanding River Segment and requires measures to prevent and minimize environmental impacts. As part of this project the Owner requires development of an inadvertent fluid release prevention, monitoring, and contingency plan (Plan) and implementation of the plan during all HDD operations for the Kennebec River Crossing.

The HDD drill site will be on the east side of the river at the Moxie Gore termination station and the receiving site is on the west of the river at the West Forks termination station. There is a vertical drop of more than 300 feet from the termination stations to the river valley and the HDD is approximately 3,000 feet in horizontal length.

2 PLAN SUBMITTAL REQUIREMENTS

The Contractor shall submit for Owner approval a Plan that includes the address of the regulatory agencies and the 1-800 spill hotline number for reporting releases of drilling fluids into water resources, a description of the means, methods, materials and equipment the Contractor will use prior to, during and after the HDD operations required for this project. The Contractor shall revise and resubmit the Plan if site conditions warrant any changes. Written approval of the Plan by the Maine Department of Environmental Protection and the Owner shall be obtained prior to the start of work.

3 RELEASE PREVENTION

The Contractor is responsible for the engineering design of the HDD for this project and this Inadvertent Fluid Release Plan shall be prepared in conjunction with their detailed design.

This plan shall document preventative measures incorporated into the design. This includes but is not limited to measures such as:

- Subsurface and geotechnical investigations that were performed.
- Engineering standards employed.
- Design assumptions used.
- Calculations made to estimate soil/bedrock fracturing under planned fluid pressures.
- HDD alignment changes required (increased depth, poor soil avoidance, etc.) based on site conditions.
- Design features used for this project that were used successfully on similar projects or that are used to remedy prior problems.
- Drilling fluid composition for anticipated soil conditions.

4 DRILLING FLUID

The Contractor's Plan shall discuss the purpose and use of drilling fluids in HDD operations, including, but is not limited to:

- A description of how the drilling fluids remove cuttings and spoils from the bore hole, lubricate and cool the drill head and keep the bore hole from collapsing.
- A description of mud motors and how the drilling fluids are pumped through the drill steel and out of the drill head.
- A description of how the high-pressure fluid used during drilling creates a chance of an inadvertent release of drilling fluids due to weak spots/seams in the overlying soils that cannot contain the fluid pressure and allows migration of the fluids to the surface.
- A description of the chemical composition and characteristics of drilling fluid and any/all additives. Drilling fluid is comprised of water and naturally occurring clay called sodium montmorillonite (bentonite). Bentonite is a non-toxic, non-reactive, inert material that allows the HDD Contractor to monitor and adjust the viscosity of the drilling fluid to achieve the desired carrying and lubricating properties.
- Documentation that the drilling fluid composition complies with all Federal, State, and local environmental regulations.
- Documentation that no contamination is introduced into the soil during the drilling, reaming, or conduit installation processes.

4.1 Additives

The Plan will include how and why additives are used in the drilling fluid to adjust the viscosity, improve hole integrity, prevent, or reduce fluid release, and how adjustments to the drilling fluid characteristics are made during the drilling operations. The Plan will describe the names and chemical compositions of additives proposed for this project including clays, organic fibers, modified starches and non-reactive polymers. Petroleum-based additives shall not be used. Safety Data Sheets for all additives used will also be included in the Plan.

Additives that are not listed in the approved Plan shall not be used.

4.2 Disposal

The Plan shall describe drilling fluid and spoils collection, segregation, transportation and disposal. Recycling and reuse of drilling fluids shall be used to limit disposal quantities. Prior to drilling operations, the HDD contractor shall identify one or more licensed landfills or off-site facilities for disposal of the cuttings, spoils and excess drilling fluid, and shall include the names and licenses of these facilities in this Plan.

The HDD contractor will dispose of all fluids in a manner that is in compliance with all permits and applicable Federal, State, and local regulations.

5 DESIGN CONSIDERATIONS

The Owner and its Consultants will undertake several steps during design to minimize the occurrence of an inadvertent release of drilling fluid.

5.1 Identify Soil and Subsurface Conditions

The Owner and its Consultants will undertake geotechnical investigations to identify the materials being drilled through, resistance to drilling operations, and resistance to fluid migration. The Owner will provide the geotechnical report to the Contractor for their use in designing the HDD for this project.

5.2 Drill Design

The Contractor shall prepare detailed design calculations and plans identifying the drill path, expected spoils volumes, pipe installation stresses and fluid pressures.

5.3 Additional Modeling for Kennebec River Crossing

For the HDD crossing of the Kennebec River, the drilling fluid will need to circulate at a high pressure. The Contractor shall perform site-specific modeling to estimate the ability of the overlying soils to withstand fluid migration (Hydrofracture Modeling). These models shall be

used in conjunction with the expected fluid pressures to determine the appropriate installation depth.

5.4 Drill Fluid Return Estimates

The Plan shall describe how a complete recovery of all circulating drilling fluids is not expected due to naturally occurring voids and low-density areas within the soil which will be filled by the fluids immediately adjacent to the borehole during the drilling process. The plan shall estimate typical expected fluid return volumes along the borehole alignment during all the HDD phases, including pilot hole, 1st reaming, 2nd reaming etc. so that abnormal/low fluid returns can be monitored and evaluated/investigated.

6 MONITORING AND ACTION PLAN

The Plan shall include the Contractors monitoring of HDD activities along the drilling path and downstream of the drilling path, including on the river, and the Contractors actions required for various site conditions. The Plan shall describe how HDD operations will be coordinated/scheduled with the Harris Hydropower Dam owner (Brookfield Renewables) to facilitate inadvertent fluid release monitoring during periods of low river flow. The Monitoring and Action Plan shall include but is not limited to the following:

Table 5-1:

Drilling Fluid Monitoring and Action Plan Summary		
Condition	Status	Actions
Condition 1: Normal Drilling Conditions	Normal drilling fluid circulation is	<ul style="list-style-type: none">• Perform routine collection of drilling fluid at endpoints• Perform routine drilling data collection

Drilling Fluid Monitoring and Action Plan Summary		
Condition	Status	Actions
	maintained	<ul style="list-style-type: none">• Conduct routine visual monitoring for surface releases along drill path
Condition 2: Loss or Reduction of Circulation	Loss or significant reduction of fluid circulation	<ul style="list-style-type: none">• Notify Owner• Adjust drilling parameters to regain circulation• Increase visual monitoring for surface release• Continue drilling if no release is detected
Condition 3: Drilling Fluid Release and Remediation	Drilling fluid release is confirmed	<ul style="list-style-type: none">• Notify Owner• Monitor and document release area• Contain and collect release if feasible• Suspend HDD operations if containment is not feasible

6.1 Condition 1: Normal Drilling Conditions

The HDD Contractor shall maximize recirculation of drilling fluid surface returns and provide solids control and fluid cleaning equipment of a configuration and capacity that can process surface returns and produce drilling fluid suitable for reuse.

The Contractor shall at all times provide and maintain instrumentation which accurately locates the pilot hole, measures drill string axial and torsional loads, and measures the drilling fluid discharge rate and pressure.

The Owner and authorized regulatory agency representatives shall have access to these instruments and their readings upon request. A log of all recorded readings shall be maintained by the Contractor at the drill rig site and shall become part of the construction record.

Routine visual monitoring under Condition 1 shall consist of periodic visual examination by the HDD Contractor personnel along the drilled alignment. Due to the land cover and terrain at the Kennebec River crossing these visual inspections will be made on foot.

These examinations shall be made periodically on a time interval not to exceed one hour. The name of the inspector, time of the examination, and observations shall be kept in a log at the drill rig site and shall be available for inspection.

6.2 Condition 2: Loss or Reduction of Circulation

Condition 2 actions shall be implemented if the drilling fluid fails to circulate as expected. Drilling fluid circulation shall be evaluated on the basis of comparing actual quantities against the planned quantities for the volume of fluid being recovered, drilling fluid pressures, and location of fluid recovered.

The Contractor shall continuously compare estimated fluid returns with measured returns to monitor for drilling fluid loss and inadvertent fluid release. The following minimum actions shall be implemented if a loss or significant reduction of drilling fluid circulation occurs.

- 6.2.1 HDD Contractor will notify the Owner who may notify regulatory agency representatives that drilling is continuing under Condition 2.
- 6.2.2 The Contractor shall increase monitoring frequency from Routine to Focused monitoring. Focused monitoring consists of continuous monitoring of the drill alignment by personnel with no other duties. Sufficient personnel will be used to ensure that each portion of the alignment is inspected at least once every 30 minutes.
- 6.2.3 HDD Contractor shall immediately take steps to restore circulation. These steps shall include, but are not be limited to:
 - Size the hole. Sizing (Swabbing) involves withdrawing the drill string to mechanically clean the drilled hole.

- Adjust drilling fluid viscosity and gelling properties to encourage annular flow and stabilize the entire structure.

6.2.4 The HDD Contractor shall consider the following adjustments in addition to the above steps.

- Adding additional pre-approved filling or stabilizing materials to potentially seal fissures in the soil.
- Adjust the drill cutting heads and speeds for potential soil pockets.

Once circulation is restored, drilling shall continue under Condition 2 for a period of not less than eight (8) drilling hours. If a release is not identified, and loss or significant reduction of drilling fluid circulation does not re-occur, the HDD Contractor shall notify the Owner, who may notify regulatory agency representatives that drilling under Condition 1 has resumed.

The HDD Contractor will keep the Owner notified about changes to circulation status, including if circulation has been restored or partially restored. The Owner may notify regulatory agency representatives about these changes.

6.3 Condition 3: Drilling Fluid Release, Containment and Remediation

This section covers the general principles for Condition 3 and drilling fluid containment. More detailed requirements for containment and equipment are included in Section 6 of this plan. If a drilling fluid release is detected the Contractor shall at a minimum take the following immediate actions.

- 6.3.1 The HDD Contractor shall immediately notify the Owner that a fluid release has been detected. The Owner will notify regulatory agency representatives as soon as possible, however no later than 24 hours after a fluid release has been detected.
- 6.3.2 HDD Contractor shall immediately begin containment efforts. See Section 6 for discussion of containment methods and equipment requirements.
- 6.3.3 The Contractor shall take steps to reduce released fluid volumes and pressures that include but are not limited to:
- Size and swab the bore hole
 - Adjust drilling fluid viscosity and gel properties to restore circulation
 - Add additional pre-approved filling or stabilizing materials to potentially seal fissures in the soil.
- 6.3.4 Once containment has been established HDD drilling will continue under Condition 3. If the amount of the release occurring exceeds that which can be contained and collected, drilling operations will be suspended until released volumes can be properly contained.
- 6.3.5 The Contractor shall continue Focused Monitoring, as discussed in section 5.2.2, as well as downstream of the drilling alignment, to ensure additional fluid releases have not occurred.
- 6.3.6 All measures necessary will be undertaken to prevent release of drilling fluid to the Kennebec River.

If the amount of any drilling fluid release, either on land or within the waters, exceeds that which can be feasibly contained and collected, drilling operations will be suspended and the HDD Contractor shall notify the Owner, who will notify regulatory agency representatives that drilling cannot continue until effective fluid containment measures are developed and implemented without a continuous release of drilling fluid. Drilling will not resume until the Owner and regulatory agencies have approved a plan for continuing with limited releases or recovering drilling equipment and halting drilling activities.

Drilling fluid returns may stop as the drilling fluid consistency changes. If drilling fluid stops returning the surface containment measures shall be maintained in place and drilling will continue under Condition 2.

The HDD Contractor shall keep the Owner and regulatory agency representatives notified when fluid circulation has been restored, as well as the status of any additional releases and their containment.

7 CONTAINMENT METHODS AND EQUIPMENT

The Contractors Plan shall describe containment methods and equipment required based on the potential locations of the release and potential volume of fluid.

The Plan shall describe in detail site specific containment methods, equipment requirements, equipment staging, communication responsibilities, contractors' personnel training and staffing during a release incident. The equipment required to response to an inadvertent fluid release shall be on site, accessible and ready for deployment during all drilling activities.

7.1 Kennebec River Crossing, In Water

The Plan shall describe river low-flow and high-flow conditions and how release monitoring will be coordinated with and shall occur during low river flow conditions. The Plan will document the communication process such as chain of command, responsible parties, and reporting and remediation time frames.

The Plan shall describe how drilling fluid is heavier than water and is typically released at low velocities and settles in low areas. The Plan shall detail how to place barriers around a release in the river, how to divert the river flow away from the release site, how to create a sump within the river diversion, how to pump the released fluid out of the sump, how to collect and transport fluid for disposal, how the inadvertent fluid release site is restored, and how the river diversion is removed.

The Contractors Plan shall describe containment material and equipment staging near the river bank above high water levels. This list of additional containment materials should include barriers, sump pumps, power sources, and hoses and containment tanks that will be staged at the HDD entry or exit points within 1,000 feet of the river.

Specific barriers and equipment shall be identified by the HDD Contractor for the Kennebec River crossing.

7.2 Kennebec River Crossing, On Land

The Plan shall describe spill prevention materials for the HDD entry and exit points.

The HDD Contractor shall discuss how a fluid release containment sump will be constructed on land in soil areas and in shallow bedrock areas, and describe how contained fluids are managed, transported and disposed of.

Any fluid released before a containment can be established shall be contained with temporary barriers such as sand bags, silt fence or filter bags, and then swept back into the containment sump or contained in low areas and vacuumed into holding tanks.

Specific barriers and equipment shall be identified by the HDD Contractor in this Plan.

8 REMEDIATION

The Contractor shall develop and provide a site specific plan for remediation of fluid releases in water and on land to the Owner and regulatory agencies for their review and approval, as part of this Plan, before commencement of drilling activities.

If a fluid release occurs, the HDD Contractor shall contain all fluids, remove drilling fluid that can be vacuumed or swept up, and shall restore the release site.

8.1 Kennebec River Crossing, In Water

The Plan shall discuss removal of drilling fluid from the collection sump and the level of remediation that will be achieved. The Plan will document the communication process and remediation efforts with ample documentation for the Owner and regulatory agencies. The Owner and/or regulatory agencies shall observe the Contractors remediation activities.

After the sump and containment have been remediated and removed the Contractor shall inspect the riverbed a minimum of 500 feet downstream from the fluid release site looking for pockets of

slower moving water where drilling fluid may have collected. Any pockets located shall be evaluated to determine if drilling fluid is present and, if so, whether and how it can be removed.

8.2 Kennebec River Crossing, On Land

On land the drilling fluid shall be collected into a sump and removed by pumping or vacuuming. Repeated flushes with clean potable water shall be used to remove drilling fluid from vegetation. The Plan will outline the procedures necessary for stabilizing and restoring all disturbed areas to pre-existing conditions.